

Claims

- [c1] 1. An open MRI system comprising:
an open MRI magnet system; and
a vibration isolation system adapted to support the MRI magnet system.
- [c2] 2.The open MRI system of claim 1, wherein a spring constant and damping
of the vibration isolation system are adjustable.
- [c3] 3.The open MRI system of claim 1, wherein the vibration isolation system
comprises a plurality of pneumatic isolators.
- [c4] 4.The open MRI system of claim 1, wherein the vibration isolation system
comprises a plurality of active vibration control isolators.
- [c5] 5.The open MRI system of claim 1, further comprising a balance mass.
- [c6] 6.The open MRI system of claim 5, wherein the balance mass is adjustable.
- [c7] 7.The open MRI system of claim 1, wherein the vibration isolation system is
secured to a floor and the MRI magnet system is attached over the vibration
isolation system.
- [c8] 8.The open MRI system of claim 1, wherein the vibration isolation system is
configured within a footprint of the MRI magnet system.
- [c9] 9.The open MRI system of claim 1, further comprising a structural holder
positioned between the vibration isolation system and the MRI magnet
system.
- [c10] 10.The open MRI system of claim 1, wherein the vibration isolation system is
retrofitted to a preexisting MRI magnet system.
- [c11] 11.The open MRI system of claim 10, wherein the vibration isolation system
is mounted on posts such that MRI magnet system supports do not contact a
floor of a site where the MRI magnet system is located.
- [c12] 12.The open MRI system of claim 1, wherein the vibration isolation system is

site tunable.

[c13] 13.The open MRI system of claim 11, wherein the vibration isolation system is tuned to minimize the magnet system Q factor and to control a bandwidth of the MRI magnet system vibration response at a predominant MRI magnet exciting frequencies.

[c14] 14. An open MRI system comprising:

- (a) a first assembly comprising:
 - (1) a longitudinally-extending and generally-vertically-aligned first axis;
 - (2) at least one superconductive main coil positioned around said first axis and carrying a first main electric current in a first direction; and
 - (3) a first vacuum enclosure enclosing said at least one superconductive main coil of said first assembly;
- (b) a second assembly longitudinally spaced apart from and disposed below said first assembly, comprising:
 - (1) a longitudinally-extending second axis generally coaxially aligned with said first axis;
 - (2) at least one superconductive main coil positioned around said second axis and carrying a second main electric current in said first direction; and
 - (3) a second vacuum enclosure enclosing said at least one superconductive main coil of second assembly;
- (c) at least one support beam external to said first and second vacuum enclosure having a first end attached to said first assembly and having a second end attached to said second assembly; and
- (d) a vibration isolation system.

[c15] 15.The open MRI system of claim 14, wherein a spring constant and damping of the vibration isolation system are adjustable.

[c16] 16.The open MRI system of claim 14, wherein the vibration isolation system comprises a plurality of pneumatic isolators.

[c17] 17.The open MRI system of claim 14, wherein the vibration isolation system

comprises a plurality of active vibration control isolators.

- [c18] 18.The open MRI system of claim 14, further comprising an adjustable balance mass.
- [c19] 19.The open MRI system of claim 14, wherein the vibration isolation system is secured to a floor and the MRI magnet system is attached over the vibration isolation system.
- [c20] 20.The open MRI system of claim 14, wherein the vibration isolation system is configured within a footprint of the MRI magnet system.
- [c21] 21.The open MRI system of claim 14, wherein:
the vibration isolation system is retrofitted to a preexisting MRI magnet system; and
the vibration isolation system is mounted on posts such that MRI magnet system supports do not contact a floor of a site where the MRI magnet system is provided.
- [c22] 22.The open MRI system of claim 14, wherein the vibration isolation system is site tuned to minimize the magnet system Q factor and to control a bandwidth of the MRI magnet system vibration response at a predominant MRI magnet exciting frequencies.
- [c23] 23.The method of installing an open MRI system, comprising:
providing the open MRI system which comprises a vibration isolation system and an open magnet system;
measuring environmental disturbances and vibrations at a first site;
selecting the vibration isolation system based on the measuring step; and
installing the MRI system at the first site.
- [c24] 24.The method of claim 23, wherein the step of selecting comprises:
selecting a high damping isolation system when significant low frequency vibrations or disturbances are measured at the first site; or
selecting a low damping isolation system when only high frequency

disturbances or vibrations are measured at the first site.

- [c25] 25.The method of claim 24, further comprising adjusting a balance mass to optimize a center of gravity of the magnet system.
- [c26] 26.The method of claim 25, wherein the step of adjusting is performed before or after the step of installing.
- [c27] 27.The method of claim 23, wherein the step of measuring is performed before the step of installing.
- [c28] 28.The method of claim 23, wherein the steps of measuring and selecting are performed before the step of installing.
- [c29] 29.The method of claim 23, further comprising adjusting the damping of the vibration isolation system to minimize the magnet system Q factor and control a bandwidth of a vibrational response at predominant exciting frequencies.
- [c30] 30.The method of claim 23, wherein the vibration isolation system comprises a plurality of pneumatic isolators.
- [c31] 31.The method of claim 23, wherein the vibration isolation system comprises a plurality of active vibration control isolators.
- [c32] 32.The method of claim 23, wherein the step of installing comprises securing the vibration isolation system to a floor, such that the MRI magnet system is provided over the vibration isolation system.
- [c33] 33.The method of claim 23, further comprising:
detaching the MRI system from a floor; and
retrofitting the vibration isolation system to the magnet system of the MRI system prior to the step of installing the MRI system at the first site.
- [c34] 34.A method of retrofitting a preexisting open MRI system comprising attaching a vibration isolation system to a magnet system of the preexisting MRI system.

- [c35] 35.The method of claim 34, further comprising detaching the magnet system from a floor prior to the step of attaching the a vibration isolation system.
- [c36] 36.The method of claim 34, wherein the vibration isolation system comprises a plurality of pneumatic isolators.
- [c37] 37.The method of claim 34, wherein the vibration isolation system comprises a plurality of active vibration control isolators.
- [c38] 38.The method of claim 34, further comprising securing a plurality of posts to a floor and securing the vibration isolation system to the posts, such that the MRI magnet system is provided over the vibration isolation system and such that supports of the preexisting MRI system do not contact the floor.

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